

patterning said conductive layer in a dry plasma etch chamber, said patterning comprising:
etching said hard mask layer and said buffer layer exposed by said resist mask to
form a hard mask that exposes a part of said conductive layer;
thereafter stripping away said resist mask; and
thereafter etching said conductive layer exposed by said hard mask.

21. (New) The method of claim 20 wherein said hard mask layer comprises silicon oxynitride.
22. (New) The method of claim 20 wherein said buffer layer comprises an oxide.
23. (New) The method of claim 20 wherein said buffer layer comprises silicon dioxide.
24. (New) The method of claim 20 wherein said step of etching said hard mask layer comprises a chemistry containing CF₄ gas.
25. (New) The method of claim 20 wherein said step of etching said conductive layer comprises a main etch step followed by an overetch step.
26. (New) The method of claim 20 further comprising etching said resist layer to trim said resist layer prior to said step of etching said hard mask layer wherein said etching of said resist layer is performed in said dry plasma etch chamber.

27. (Once amended) A method for forming a semiconductor device, the method comprising:

providing a polysilicon layer overlying a semiconductor substrate;
providing a hard mask layer overlying said polysilicon layer;
providing a resist layer overlying said hard mask layer;
 patterning said resist layer to form a resist mask that exposes a part of said hard
mask layer; and
 patterning said polysilicon layer in a dry plasma etch chamber and wherein said
patterning comprises:
 etching said hard mask layer exposed by said resist mask to form a hard mask that
exposes a part of said polysilicon layer;
stripping away said resist mask in a first process step;
removing polymer residue resulting from said stripping step in a second process
step; and
etching said polysilicon layer exposed by said hard mask.

28. (New) The method of claim 27 wherein the step of patterning said polysilicon
layer includes stripping away said hard mask.

29. (New) The method of claim 27 further comprising cleaning away polymer residue
from said hard mask after stripping away said resist mask.

30. (New) The method of claim 27 wherein said hard mask layer comprises silicon
oxynitride.

31. (New) The method of claim 27 wherein said step of etching said hard mask layer comprises a chemistry containing CF₄ gas.

32. (New) The method of claim 27 wherein said step of etching said polysilicon layer comprises a main etch step followed by an overetch step.

33. (New) The method of claim 27 further comprising etching said resist layer to trim said resist layer prior to said step of etching said hard mask layer wherein said etching of said resist layer is performed in said dry plasma etch chamber.

34. (New) A method for forming a semiconductor device, the method comprising: providing a wafer having a substrate, a first layer formed on the substrate, a hard mask layer formed on the first layer, a buffer layer formed on said hard mask layer, and a resist layer formed on the buffer layer;

patterning said hard mask layer and said buffer layer to form a hard mask that exposes a part of said first layer;

removing said resist layer; and

patterning said first layer.

35. (New) The method of claim 34 wherein the steps of patterning said hard mask layer, removing said resist layer, and patterning said first layer are performed in a dry plasma etch chamber.

36. (New) The method of claim 34 wherein the step of patterning said hard mask layer includes etching the hard mask layer and the buffer layer.

37. (New) The method of claim 36 wherein said step of etching said hard mask layer comprises a chemistry containing CF₄ gas.

38. (New) The method of claim 34 wherein the step of patterning said first layer includes etching said first layer and removing said hard mask layer and said buffer layer.

39. (New) The method of claim 38 wherein said step of etching said first layer comprises a main etch step followed by an overetch step.

40. (New) The method of claim 34 wherein the step of patterning said hard mask layer includes patterning a resist layer.

41. (New) The method of claim 40 further comprising etching said resist layer to trim said resist layer prior to said step of etching said hard mask layer wherein said etching of said resist layer is performed in said dry plasma etch chamber.

42. (New) The method of claim 34 wherein said hard mask layer comprises silicon oxynitride.

43. (New) The method of claim 34 wherein said buffer layer comprises an oxide.

44. (New) The method of claim 34 wherein said buffer layer comprises silicon dioxide.

45. (Once amended) A method of forming a semiconductor device, the method comprising:

providing a semiconductor substrate with a conductive layer formed thereon;
providing a hard mask layer above said conductive layer;
providing a resist layer above said hard mask layer;
patterning said resist layer to form a resist mask that exposes a part of said hard
mask layer; and
patterning said conductive layer in a dry plasma etch chamber, said patterning
comprising:
etching said hard mask layer exposed by said resist mask to form a hard mask that
exposes a part of said conductive layer;
thereafter stripping away said resist mask using a first chemistry;
thereafter removing polymer residue using a second chemistry different from the
first chemistry; and
thereafter etching said conductive layer exposed by said hard mask.

46. (New) The method of claim 45 wherein said hard mask layer comprises silicon
oxynitride.

47. (New) The method of claim 45 wherein said step of etching said hard mask layer
comprises a chemistry containing CF₄ gas.

48. (New) The method of claim 45 wherein said step of etching said conductive layer
comprises a main etch step followed by an overetch step.

49. (New) The method of claim 45 further comprising etching said resist layer to trim said resist layer prior to said step of etching said hard mask layer wherein said etching of said resist layer is performed in said dry plasma etch chamber.

50. (New) A method for forming a semiconductor device, the method comprising: providing a wafer having a substrate, a first layer formed on the substrate, a hard mask layer formed on the first layer, a buffer layer formed on said hard mask layer, and a resist layer formed on the buffer layer; patterning said hard mask layer to form a hard mask that exposes a part of said first layer; removing said resist layer; and patterning said first layer.

51. (New) The method of claim 50 wherein the steps of patterning said hard mask layer, removing said resist layer, and patterning said first layer are performed in a dry plasma etch chamber.

52. (New) The method of claim 50 wherein the step of patterning said hard mask layer includes etching the hard mask layer.

53. (New) The method of claim 52 wherein said step of etching said hard mask layer comprises a chemistry containing CF₄ gas.

54. (New) The method of claim 50 wherein the step of patterning said first layer includes etching said first layer and removing said hard mask layer.

55. (New) The method of claim 54 wherein said step of etching said first layer comprises a main etch step followed by an overetch step.

56. (New) The method of claim 50 wherein the step of patterning said hard mask layer includes patterning a resist layer.

57. (New) The method of claim 56 further comprising etching said resist layer to trim said resist layer prior to said step of etching said hard mask layer wherein said etching of said resist layer is performed in said dry plasma etch chamber.

58. (New) The method of claim 50 wherein said hard mask layer comprises silicon oxynitride.